

PROJECT TITLE: The effect of rate of seeding and planting date on yield and quality of Bowman, Clark, and Gallatin spring barley varieties. 1990.

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PROJECT LOCATION: MSU - Southern Agricultural Research Center, Huntley, MT 59037

OBJECTIVES: To evaluate the yield and quality of three spring barley varieties grown under dryland cropping. By comparing two Montana barley selections to the North Dakota variety Bowman, which has demonstrated superior yield and test weight under severe moisture stress conditions.

SUMMARY AND RESULTS: The data for the effect of planting date and seeding rates on yield, test weight, 1000 kernel weight, heads/meter row, percent plump, percent thin, seeds/head, plant height, and heading date are given in Tables 1-10. Bowman at 18 and 23 seeds/ft. was highest yielding at the first two dates, Clark at 23 seeds/ft. and Bowman at 18 seeds/ft. were highest yielding at the third date, while Gallatin at 18 and 23 seeds/ft was highest at the fourth and fifth dates. The sixth date is included here for information only, and not used in overall comparisons as the plots were so poor, we only took plant height, heading date, and yield.

Overall, as planting date advanced, yields and most other characteristics decreased. As seeding rate (seeds/ft.) increased, yields increased, while kernel wts. and plump decreased, and thin increased. Most other characteristics were not affected by seeding rate. These data were very similar to the previous years data.

Future Plans: The data presented here is only preliminary. This study will continue another year, and then analyzed and written up for publication.

TABLE 1 . INFLUENCE OF 3 VARIETIES AT 6 PLANTING DATES AND 4 SEEDING
RATES OF DRYLAND SPRING BARLEY, SARC, HUNTLEY, MT.

1st Date planted 4-02-90

VARIETY	SEED RATE	YIELD BU/AC	TESTWT LB/BU	1000/K WT	PLANTS /METER	PLUMP %	THIN %	SEEDS/ HEAD	PLANTHT INCHES	HEAD DATE
BOWMAN	23 sd/ft	88.95	51.75	43.35	209.5	88.78	2.625	19.25	33.75	162.0
BOWMAN	18 sd/ft	86.65	51.75	44.13	219.0	92.77	2.800	19.00	33.75	162.0
GALLATIN	23 sd/ft	84.35	47.43	31.95	243.5	47.15	21.23	22.00	35.75	163.5
GALLATIN	18 sd/ft	83.20	48.40	34.63	198.5	59.18	17.15	24.50	35.50	163.8
BOWMAN	13 sd/ft	82.48	51.85	45.80	227.0	91.97	1.875	20.25	35.00	162.0
CLARK	18 sd/ft	81.38	46.20	35.75	304.0	32.68	30.48	23.50	36.50	165.0
GALLATIN	13 sd/ft	77.53	49.72	37.05	218.5	66.38	9.550	24.00	37.00	164.8
CLARK	23 sd/ft	76.48	46.22	32.35	232.0	26.38	36.72	23.25	35.25	164.8
GALLATIN	8 sd/ft	71.68	50.60	41.18	193.5	76.53	7.850	25.25	35.50	165.3
CLARK	13 sd/ft	70.93	46.95	34.45	248.0	30.97	32.73	25.50	37.25	165.5
CLARK	8 sd/ft	68.78	48.40	37.28	175.5	58.95	14.90	24.50	37.50	165.8
BOWMAN	8 sd/ft	59.85	51.53	47.05	214.0	91.95	1.700	21.50	36.00	162.3

****SUMMARY STATISTICS:****

OVERALL MEAN	=	77.69	49.23	38.75	223.6	63.64	14.97	22.71	35.73	163.9
LSD(0.05 by t)=		11.57	.9055	3.594	60.10	8.562	4.974	1.892	2.398	1.411
P-VALUE TRTS	=	.0003	.0000	.0000	.0210	.0000	.0000	.0000	.0407	.0000
CV (S/MEAN)	=	10.35	1.278	6.447	18.68	9.352	23.10	5.792	4.665	.5986
CV (SE/MEAN)	=	5.176	.6392	3.224	9.342	4.676	11.55	2.896	2.333	.2993

TABLE 2 . INFLUENCE OF 3 VARIETIES AT 6 PLANTING DATES AND 4 SEEDING
RATES OF DRYLAND SPRING BARLEY, SARC, HUNTLEY, MT.

2nd Date planted 4-13-90

VARIETY	SEED RATE	YIELD BU/AC	TESTWT LB/BU	1000/K WT	PLANTS /METER	PLUMP %	THIN %	SEEDS/ HEAD	PLANTHT INCHES	HEAD DATE
BOWMAN	18 sd/ft	82.07	50.80	43.60	235.0	91.58	2.350	20.50	33.25	164.8
BOWMAN	23 sd/ft	81.63	50.78	40.18	249.5	85.55	2.700	18.50	33.75	163.8
GALLATIN	18 sd/ft	76.05	47.23	31.75	221.5	42.63	34.13	24.50	33.50	169.0
BOWMAN	13 sd/ft	72.47	51.35	43.97	178.0	89.65	2.500	19.00	33.50	164.8
CLARK	23 sd/ft	65.60	44.20	29.28	214.0	7.900	68.40	23.25	34.50	169.3
CLARK	18 sd/ft	64.20	44.47	32.20	187.5	13.45	62.83	24.75	34.00	168.3
GALLATIN	23 sd/ft	63.63	44.92	28.83	218.5	10.58	67.18	24.50	35.50	168.8
CLARK	23 sd/ft	62.45	44.57	31.35	244.0	10.80	68.00	23.75	33.75	170.0
BOWMAN	8 sd/ft	60.90	51.47	44.32	192.0	91.88	1.750	23.75	33.25	165.3
GALLATIN	13 sd/ft	59.42	46.30	32.05	192.0	41.92	28.58	25.75	34.25	169.0
CLARK	8 sd/ft	58.55	47.02	33.17	171.5	32.42	27.60	24.75	34.50	170.3
GALLATIN	8 sd/ft	55.25	47.60	33.57	188.5	31.17	40.28	25.75	33.75	170.0

****SUMMARY STATISTICS:****

OVERALL MEAN	=	66.85	47.56	35.36	207.7	45.79	33.86	23.23	33.96	167.8
LSD(0.05 by t)=		10.73	1.950	5.723	61.73	19.77	22.96	3.294	2.061	1.534
P-VALUE TRTS	=	.0000	.0000	.0000	.1720	.0000	.0000	.0002	.6335	.0000
CV (S/MEAN)	=	11.16	2.850	11.25	20.66	30.00	47.14	9.857	4.219	.6355
CV (SE/MEAN)	=	5.581	1.425	5.626	10.33	15.00	23.57	4.929	2.110	.3177

TABLE 3. INFLUENCE OF 3 VARIETIES AT 6 PLANTING DATES AND 4 SEEDING RATES OF DRYLAND SPRING BARLEY, SARC, HUNTLEY, MT.

3rd Date planted 4-23-90

VARIETY	SEED RATE	YIELD BU/AC	TESTWT LB/BU	1000/K WT	PLANTS /METER	PLUMP %	THIN %	SEEDS/ HEAD	PLANTHT INCHES	HEAD DATE
CLARK	23 sd/ft	74.05	46.57	33.40	204.5	24.80	37.85	23.25	31.50	176.3
BOWMAN	18 sd/ft	72.35	51.25	43.93	146.0	88.95	3.075	19.75	33.00	172.0
GALLATIN	23 sd/ft	72.10	47.55	34.15	153.0	49.88	20.63	25.00	33.50	175.5
BOWMAN	23 sd/ft	71.40	50.90	40.47	180.5	85.85	3.300	18.50	33.50	171.5
CLARK	18 sd/ft	69.10	46.50	34.65	165.0	27.88	34.55	24.00	33.00	176.3
GALLATIN	18 sd/ft	66.78	48.22	34.97	186.5	57.00	17.98	24.75	32.50	176.8
CLARK	13 sd/ft	59.18	46.05	34.83	208.5	42.78	23.33	26.25	32.00	176.8
GALLATIN	13 sd/ft	57.05	48.10	37.22	187.5	68.63	12.20	26.25	31.50	176.5
BOWMAN	13 sd/ft	56.55	50.35	45.50	215.5	87.85	2.975	20.25	33.00	172.5
CLARK	8 sd/ft	53.10	46.10	32.73	160.0	56.45	15.52	25.75	32.00	176.0
BOWMAN	8 sd/ft	49.17	50.13	45.20	172.0	89.95	2.825	21.75	32.50	172.8
GALLATIN	8 sd/ft	49.15	47.85	39.20	153.0	80.57	7.875	25.75	32.00	176.0

****SUMMARY STATISTICS:****

OVERALL MEAN	=	62.50	48.30	38.02	177.7	63.38	15.17	23.44	32.50	174.9
LSD(0.05 by t)=		10.65	1.103	4.155	57.57	10.69	8.008	2.004	2.178	1.503
P-VALUE TRTS	=	.0000	.0000	.0000	.2317	.0000	.0000	.0000	.5814	.0000
CV (S/MEAN)	=	11.84	1.588	7.597	22.52	11.72	36.68	5.943	4.659	.5974
CV (SE/MEAN)	=	5.922	.7939	3.798	11.26	5.861	18.34	2.971	2.330	.2987

TABLE 4. INFLUENCE OF 3 VARIETIES AT 6 PLANTING DATES AND 4 SEEDING RATES OF DRYLAND SPRING BARLEY, SARC, HUNTLEY, MT.

4th Date planted 5-03-90

VARIETY	SEED RATE	YIELD BU/AC	TESTWT LB/BU	1000/K WT	PLANTS /METER	PLUMP %	THIN %	SEEDS/ HEAD	PLANTHT INCHES	HEAD DATE
GALLATIN	23 sd/ft	63.28	46.05	29.75	216.0	47.55	22.67	27.00	30.00	176.8
GALLATIN	18 sd/ft	62.25	46.38	33.55	195.5	47.67	26.43	23.25	30.75	176.8
BOWMAN	23 sd/ft	60.50	49.30	38.20	205.0	70.72	7.375	18.75	30.00	176.0
CLARK	23 sd/ft	59.45	44.65	32.82	232.0	17.15	45.97	23.00	30.25	176.8
CLARK	18 sd/ft	55.30	44.30	29.45	235.5	13.90	48.92	24.25	30.00	178.3
GALLATIN	13 sd/ft	54.82	46.52	34.32	185.0	56.78	26.63	25.25	30.00	176.5
BOWMAN	18 sd/ft	53.70	49.38	38.83	260.5	72.13	8.625	19.50	31.00	176.0
CLARK	13 sd/ft	50.95	44.50	33.35	218.5	19.22	42.05	25.00	29.50	178.0
BOWMAN	13 sd/ft	48.78	48.82	38.45	208.0	68.85	8.700	18.50	30.50	176.5
CLARK	8 sd/ft	44.30	44.70	34.70	212.0	53.45	18.03	25.75	29.25	178.5
BOWMAN	8 sd/ft	39.35	48.47	38.88	204.5	71.63	7.500	20.50	26.00	176.5
GALLATIN	8 sd/ft	39.08	46.05	35.67	224.0	67.97	13.07	26.00	29.25	177.8

****SUMMARY STATISTICS:****

OVERALL MEAN	=	52.65	46.59	34.83	216.4	50.59	23.00	23.06	29.71	177.0
LSD(0.05 by t)=		6.854	.7106	2.928	77.75	8.804	8.079	2.905	2.829	1.048
P-VALUE TRTS	=	.0000	.0000	.0000	.8667	.0000	.0000	.0000	.1086	.0000
CV (S/MEAN)	=	9.050	1.060	5.843	24.98	12.10	24.42	8.755	6.619	.4116
CV (SE/MEAN)	=	4.525	.5300	2.922	12.49	6.049	12.21	4.377	3.309	.2058

TABLE 5. INFLUENCE OF 3 VARIETIES AT 6 PLANTING DATES AND 4 SEEDING RATES OF DRYLAND SPRING BARLEY, SARC, HUNTLEY, MT.
5th Date planted 5-18-90

VARIETY	SEED RATE	YIELD BU/AC	TESTWT LB/BU	1000/K WT	PLANTS /METER	PLUMP %	THIN %	SEEDS/ HEAD	PLANTHT INCHES	HEAD DATE
GALLATIN	23 sd/ft	35.15	43.83	29.22	155.0	51.40	24.27	23.50	25.50	184.8
GALLATIN	18 sd/ft	31.98	42.72	34.68	150.0	54.80	18.60	24.00	24.00	185.0
CLARK	23 sd/ft	30.52	42.13	33.67	139.5	24.27	46.93	23.50	23.75	187.0
BOWMAN	23 sd/ft	28.80	46.48	38.20	154.5	64.17	14.00	21.25	23.25	183.3
CLARK	18 sd/ft	26.83	41.63	32.80	145.5	24.65	44.90	22.00	23.00	187.5
BOWMAN	18 sd/ft	24.65	46.73	38.38	141.0	56.63	18.88	19.25	24.00	183.0
GALLATIN	13 sd/ft	23.13	46.17	37.22	137.0	51.60	16.35	25.75	23.00	185.5
CLARK	13 sd/ft	21.13	42.58	32.77	138.0	21.52	43.38	25.25	24.50	187.5
BOWMAN	13 sd/ft	20.05	44.85	38.03	141.0	55.72	20.73	18.00	23.00	184.0
GALLATIN	8 sd/ft	15.77	43.63	33.50	150.5	49.50	25.30	23.75	23.25	186.3
BOWMAN	8 sd/ft	14.73	44.85	38.40	120.0	61.00	16.15	20.00	23.00	183.5
CLARK	8 sd/ft	12.35	36.90	31.47	176.0	38.27	40.00	23.50	21.50	187.8

****SUMMARY STATISTICS:****

OVERALL MEAN	=	23.76	43.54	34.86	145.7	46.13	27.46	22.48	23.48	185.4
LSD(0.05 by t)	=	4.440	3.453	3.454	36.34	8.993	8.932	3.464	2.293	.9536
P-VALUE TRTS	=	.0000	.0001	.0000	.3629	.0000	.0000	.0008	.1633	.0000
CV (S/MEAN)	=	12.99	5.513	6.887	17.34	13.55	22.61	10.71	6.789	.3575
CV (SE/MEAN)	=	6.495	2.757	3.443	8.670	6.776	11.31	5.356	3.395	.1788

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TABLE 6. INFLUENCE OF 3 VARIETIES AT 6 PLANTING DATES AND 4 SEEDING
 RATES OF DRYLAND SPRING BARLEY, SARC, HUNTLEY, MT.
 6th Date planted 5-28-90

VARIETY	SEED RATE	YIELD BU/AC	TESTWT LB/BU	1000/K WT	PLANTS /METER	PLUMP %	THIN %	SEEDS/ HEAD	PLANTHT INCHES	HEAD DATE
BOWMAN	13 sd/ft	3.650	.0000	27.70	.0000	.0000	.0000	.0000	19.75	190.8
BOWMAN	18 sd/ft	3.325	.0000	28.67	.0000	.0000	.0000	.0000	18.75	192.0
BOWMAN	23 sd/ft	3.075	.0000	29.55	.0000	.0000	.0000	.0000	20.00	192.0
GALLATIN	18 sd/ft	2.750	.0000	26.03	.0000	.0000	.0000	.0000	18.75	197.0
CLARK	18 sd/ft	2.700	.0000	24.90	.0000	.0000	.0000	.0000	16.75	197.8
GALLATEN	23 sd/ft	2.675	.0000	23.67	.0000	.0000	.0000	.0000	19.25	196.8
CLARK	23 sd/ft	2.500	.0000	24.05	.0000	.0000	.0000	.0000	18.50	197.8
GALLATIN	13 sd/ft	2.425	.0000	28.35	.0000	.0000	.0000	.0000	18.25	197.3
CLARK	13 sd/ft	2.375	.0000	26.17	.0000	.0000	.0000	.0000	18.50	197.5
BOWMAN	8 sd/ft	2.000	.0000	29.08	.0000	.0000	.0000	.0000	18.50	192.5
GALLATIN	8 sd/ft	1.875	.0000	26.93	.0000	.0000	.0000	.0000	18.50	197.0
CLARK	8 sd/ft	1.750	.0000	26.33	.0000	.0000	.0000	.0000	18.50	197.8

****SUMMARY STATISTICS:****

OVERALL MEAN	=	2.592	.0000	26.79	.0000	.0000	.0000	.0000	18.67	195.5
LSD(0.05 by t)=		1.086	.0000	6.261	.0000	.0000	.0000	.0000	2.454	2.595
P-VALUE TRIS	=	.0295	.0000	.6484	.0000	.0000	.0000	.0000	.5462	.0000
CV (S/MEAN)	=	29.12	.0000	16.25	.0000	.0000	.0000	.0000	9.137	.9225
CV (SE/MEAN)	=	14.56	.0000	8.124	.0000	.0000	.0000	.0000	4.569	.4612

TABLE 7.

1990 Barley Rate x Date Trial

Cultivar	Date	Yield Bu/A	Test Wt. Lb/BU	Kernel Wt. gms.	Plump %	Thin %
Bowman	4/2	79.48 E	51.72 D	45.08 C	91.37 D	2.25 A
	4/13	74.27 D	51.10 C	43.02 B	89.66 CD	3.32 A
	4/23	62.37 C	50.66 C	43.77 B	88.15 C	3.04 A
	5/3	50.58 B	48.99 B	38.59 A	70.83 B	8.05 B
	5/18	22.06 A	45.72 A	38.25 A	59.38 A	17.44 C
Clark	4/2	74.39 D	46.94 C	34.96 C	37.24 C	28.71 D
	4/13	62.70 C	45.07 B	31.50 A	16.14 A	56.71 D
	4/23	63.86 C	46.31 C	33.90 BC	37.97 C	27.81 A
	5/3	52.50 B	44.54 B	32.58 AB	25.93 B	38.74 AB
	5/18	22.71 A	40.81 A	32.68 AB	27.18 B	43.80 C
Gallatin	4/2	79.19 D	49.04 D	36.20 C	62.31 C	13.94 A
	4/13	63.59 C	46.51 B	31.55 A	31.57 A	42.54 C
	4/23	61.27 C	47.93 C	36.39 C	64.02 C	14.67 A
	5/3	54.86 B	46.25 B	33.32 B	54.99 B	22.20 B
	5/18	26.51 A	44.09 A	33.66 B	51.82 B	21.13 B

Values within columns followed by the same letter are not significantly different at the 5% level.

TABLE 8.

1990 Barley RatexDate Trial

Cultivar	Date	Plants /meter	Seeds per Head	Plant Ht. in.	Head Date
Bowman	4/2	217.4 C	20.0 A	34.6 D	162.1 A
	4/13	213.6 C	20.4 A	33.4 C	164.6 B
	4/23	178.5 B	20.1 A	33.0 C	172.2 C
	5/3	219.5 C	19.3 A	29.4 B	176.3 D
	5/18	139.1 A	19.6 A	23.3 A	183.4 E
Clark	4/2	239.9 D	24.2 AB	36.6 E	165.3 A
	4/13	204.3 CB	24.1 AB	34.2 D	169.4 D
	4/23	184.5 B	24.8 B	32.1 C	176.3 C
	5/3	224.5 CD	24.5 AB	29.8 B	177.9 D
	5/18	149.8 A	23.6 A	23.2 A	187.4 E
Gallatin	4/2	213.5 B	23.9 A	35.9 E	164.3 A
	4/13	205.1 B	25.1 B	34.2 D	169.2 B
	4/23	170.0 A	25.4 B	32.4 C	176.2 C
	5/3	205.1 B	25.4 B	30.0 B	176.9 D
	5/18	148.1 A	24.2 A	23.9 A	185.4 E

Values within columns followed by the same letter are not significantly different at the 5% level.

TABLE 9.

1990 Barley Rate x Date Trial

Cultivar	Rate	Yield Bu/A	Test Wt. Lb/BU	Kernel Wt. gms.	Plump %	Thin %
Bowman	8	44.80 A	49.29 D	42.77 F	81.28 F	5.98 A
	13	56.07 CB	49.44 D	42.35 F	78.81 F	7.36 A
	18	63.89 FE	49.98 D	41.77 EF	80.41 F	7.14 A
	23	66.25 F	49.84 D	40.08 E	79.01 F	6.00 A
Clark	8	47.42 A	44.62 A	33.87 CB	47.91 C	23.21 B
	13	52.92 B	44.93 A	33.35 B	25.06 A	25.15 EF
	18	59.36 CD	44.62 A	32.97 B	22.51 A	44.30 D
	23	61.22 DE	44.75 A	32.31 AB	20.10 A	47.17 D
Gallatin	8	46.18 A	47.14 C	36.63 D	61.15 E	18.88 B
	13	54.39 B	47.36 C	35.57 CD	57.06 DE	18.66 B
	18	64.05 FE	46.59 BC	33.92 BC	52.25 CD	22.85 B
	23	63.70 FE	45.95 A	30.78 A	41.31 B	31.20 C

Values within columns followed by the same letter are not significantly different at the 5% level.

TABLE 10. 1990 Barley Rate x Date Trial

Cultivar	Rate	Plants /meter	Seeds per Head	Plant Ht. in.	Head Date
Bowman	8	180.5 A	21.50 B	30.15 A	172.1 B
	13	193.9 ABC	19.25 A	31.00 ABC	171.9 B
	18	200.3 ABC	19.60 A	31.00 ABC	171.6 B
	23	199.8 ABC	19.25 A	30.85 AB	171.3 B
Clark	8	179.0 A	24.85 DEF	30.95 AB	175.6 G
	13	211.4 C	25.15 EF	31.40 BC	175.6 GF
	18	207.5 B	23.70 CD	31.30 BC	175.1 EF
	23	204.4 ABC	23.25 C	31.05 ABC	174.8 ED
Gallatin	8	181.9 AB	25.30 EF	30.75 AB	175.1 EF
	13	184.0 AB	25.40 F	31.15 ABC	174.4 D
	18	190.4 ABC	24.20 CDE	31.25 BC	174.3 CD
	23	197.2 ABC	24.40 CDEF	32.05 C	173.9 C

Values within columns followed by the same letter are not significantly different at the 5% level.